Product Data Sheet RG225-55/18/2TDO

ebmpapst

The engineer's choice



GREEN TECH

RG225-55/18/2TDO

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1 General

Fan type	Blower	
Rotating direction looking at rotor	Clockwise	
Airflow direction	Air in axially, Air out radially	
Bearing system	Ball bearing	
Mounting position - shaft	Any	

2 Mechanics

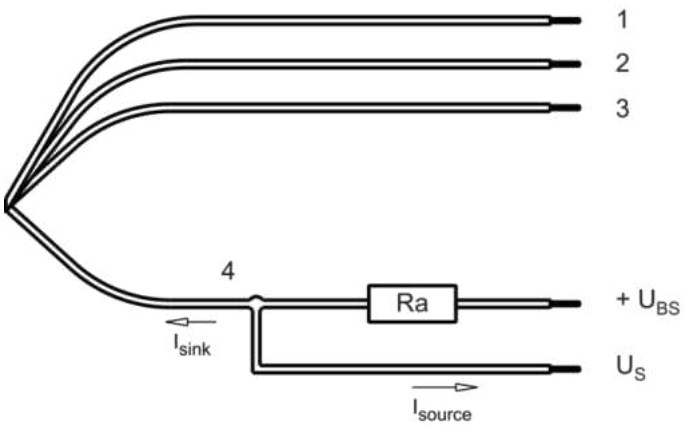
2.1 General

Width	270 mm	
Height	270 mm	
Depth	119 mm	
Mass	1,742 kg	
Housing material	Plastic	
Impeller material	Plastic	

2.2 Connections

Electrical connection	Wires	
Lead wire length Tolerance	L = 350 mm +- 10,0 mm	
Tube length Tolerance	S = 35 mm +- 5 mm	
Wire size (AWG)	20	
Insulation diameter	2,05 mm	





Wire	Color	Operation
1	red	+ UB
2	blue	- GND
3	violet	CONTR
4	white	Tacho

The auxilliaries shown on the schematic diagram (which are required for the intended use) are not part of our delivery.

Litzen 1 - 2: AWG20
Litzen 3 - 4: AWG22 (Isolationsdurchmesser 1,35mm)

Lead wire 1 - 2: AWG20
Lead wire 3 - 4: AWG22 (Insulation diameter 1,35mm)

3 Operating Data

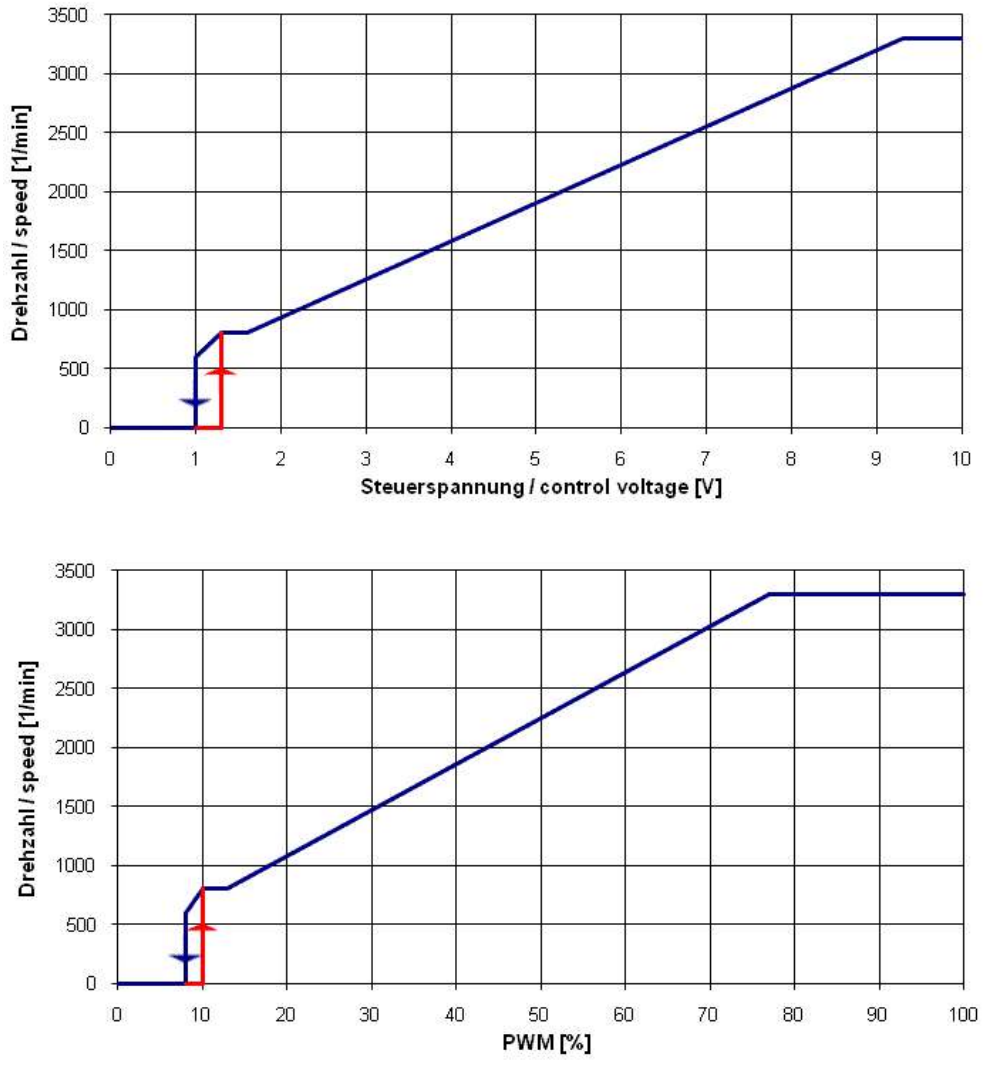
3.1 Operating Data - Electrical Interface - Input

Control input	Analog

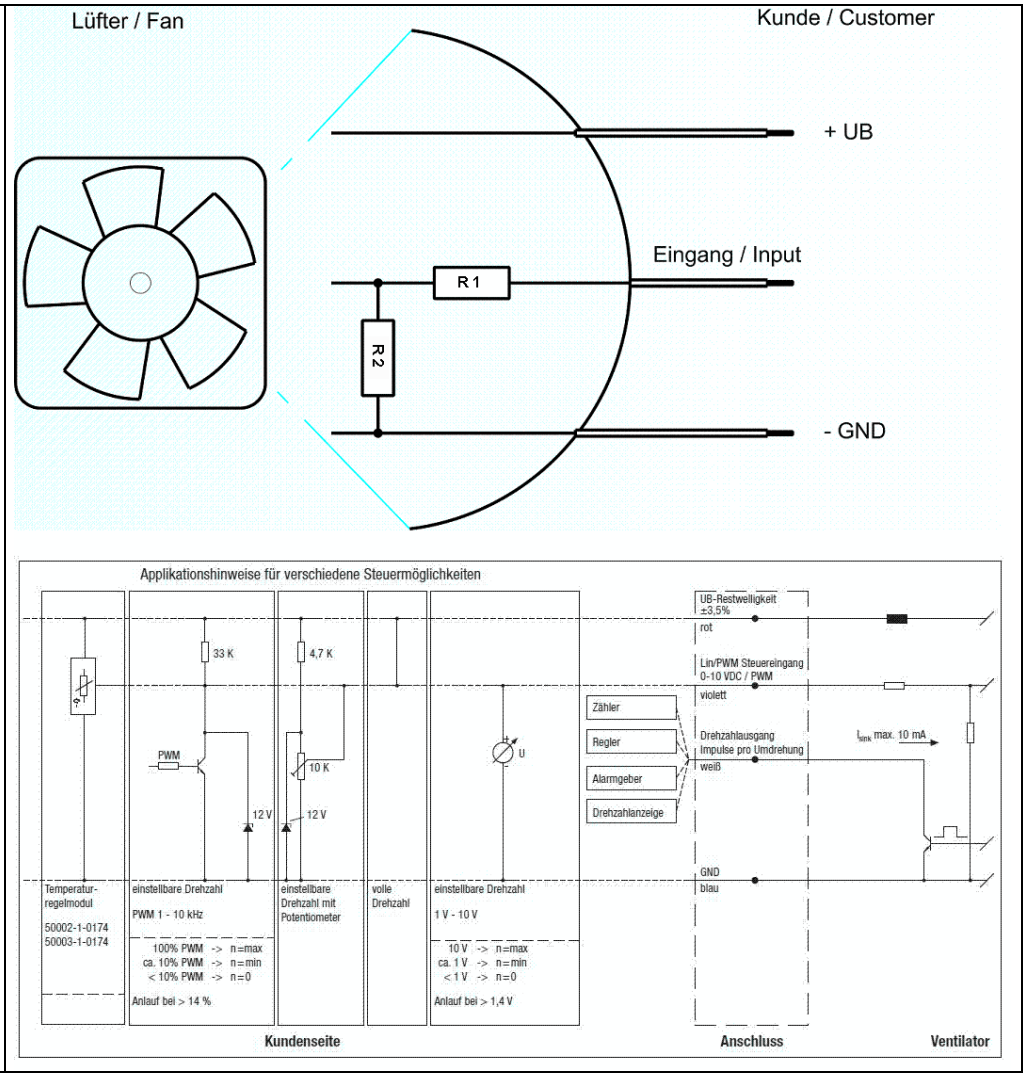
Features

PWM - Frequency		1 kHz - 10 kHz typical: 2 kHz
Input voltage range		0 V - 10 V

Characteristics



Schematics



Input voltage divider:
R1 = 47 kOhm
R2 = 36 kOhm
For protection: There is parallel to R2 a 5,1 V Z-Diode

Speed control:
By pulse-width modulation (PWM) 0 ... 100%
with switching transistor in emitter circuit and collector resistance to 12 V
Frequency = 2 kHz (1 - 10 kHz)

Information to the curve PWM:

0% - <10% PWM:	0 1/min
10% PWM:	800 1/min (Fan on, comming from 0% PWM)
10% - 13% PWM:	800 1/min (corresponding to min. speed)
13% - 78% PWM:	linear increasing curve
78% - 100% PWM:	3300 1/min (corresponding to max. speed)
10% - >8% PWM:	linear decreasing curve (comming from 100% PWM)
8% PWM:	600 1/min or 0 1/min (Fan off, comming from 100% PWM)

oder:

Speed control:

By analog voltage 0 - 10 V

Information to the curve analog:

0 V - < 1,3 V:	0 1/min
1,3 V:	800 1/min (Fan on, comming from von 0 V)
1,3 V - 1,6 V:	800 1/min (corresponding to min. speed)
1,6 V - 9,4 V:	linear increasing curve
9,4 V - 10 V:	3300 1/min (corresponding to max. speed)
1,3 V - > 1,0 V:	linear decreasing curve (comming from 10 V)
1,0 V:	600 1/min or 0 1/min (Fan off, comming from 10 V)

All values are measured in the housing!

Fan doesn't have a sensor break detection!

3.2 Electrical Operating Data

Measurement conditions: Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C; Motor axis horizontal; warm-up time before measuring 5 minutes (unless otherwise specified). In the intake and outlet area should not be any solid obstruction within 0,5 m.

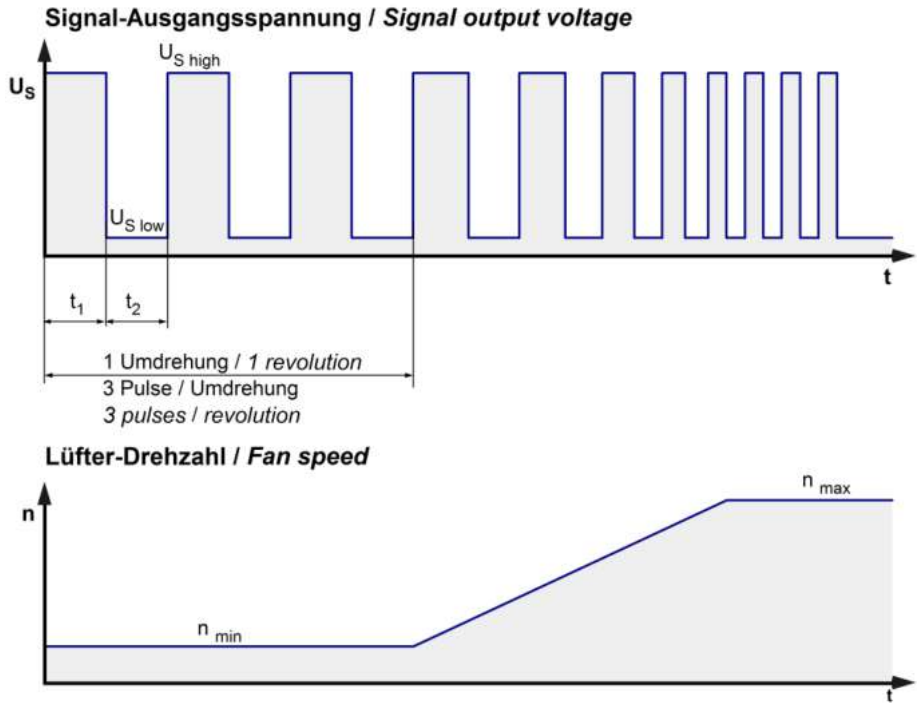
$\Delta p = 0$: corresp. to free air flow (see section 3.5)
I: corresp. to arithm. mean current value

Name	Condition		
U Contr. 0001	U Contr.: 10 V		

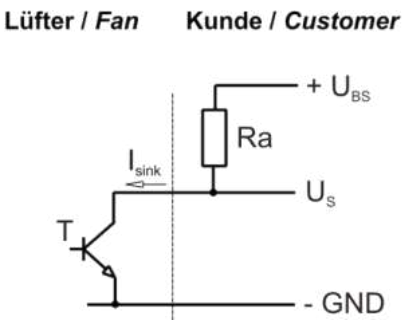
Features	Condition	Symbol	Values		
Voltage range		U	36 V		60,0 V
Nominal voltage		U_N		48,0 V	
Power consumption Tolerance	$\Delta p = 0$ U Contr. 0010	P	133 W +- 10 %	192 W +- 10,0 %	198,0 W +- 10,0 %
Current consumption Tolerance	$\Delta p = 0$ U Contr. 0010	I	3.700 mA +- 10,0 %	4.000 mA +- 10,0 %	3.300 mA +- 10,0 %
Speed Tolerance	$\Delta p = 0$ U Contr. 0010	n	2.950 1/min +- 10,0 %	3.300 1/min +- 5,0 %	3.300 1/min +- 5,0 %
Starting current consumption				4.600 mA	

3.3 Operating Data - Electrical Interface - Output

Tacho type	/2 (open collector)



$$Ra = \frac{U_{BS} - U_{S\,low}}{I_{sink}}$$



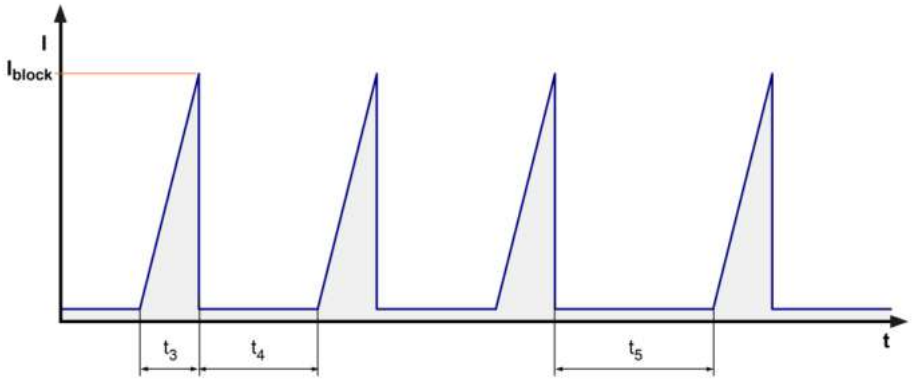
Features		Note	Values
Tacho operating voltage	U_{BS}		<= 60,0 V
Tacho signal Low	$U_{S\,low}$	I sink: 2 mA	<=0,4 V
Tacho signal High	$U_{S\,high}$	I source: 0 mA	<=60,0 V
Maximum sink current	I_{sink}		<= 20 mA
Maximum source current			0 mA
External resistor		External resistor Ra from UBS to US required. All voltages measured to GND.	
Tacho frequency		(3 x n) / 60	165 Hz
Tacho isolated from motor		No	
Slew rate			=> 0,5 V/us

n = revolutions per minute (1/min)

Please note:
At zero speed the tacho signal is at a static HIGH. It will be also HIGH when the fan is still spinning, but the speed control signal is set to zero speed already.
The tacho signal is only activated after the start-up is completed.

3.4 Electrical Features

Electronic function	Speed-Controlled	
Reversed polarity protection Max. residual current at U_N	P-CH FET I_F <= 5 mA	
Locked rotor protection	Auto restart	
Locked rotor current at U_N	I_{block} approx. 1.800 mA	
Clock signal at locked rotor	t_3 / t_4 typical: 7 s / 10,0 s	



Locked rotor signal t5:

After 2 failed start-ups there is an extended timeout of 50,0s.

3.5 Data According ErP Directive

Installation / Efficency category	A / static
Speed control	integrated
Specific ratio	1,00539
Target overall efficiency 2015	43,9 %
Overall efficiency	55,4 %
Efficiency grade	61
Power input	236 W
Speed	3.250 1/min

All values measured in optimum energy efficiency point.

Productiondatecode is printed on the fan label.

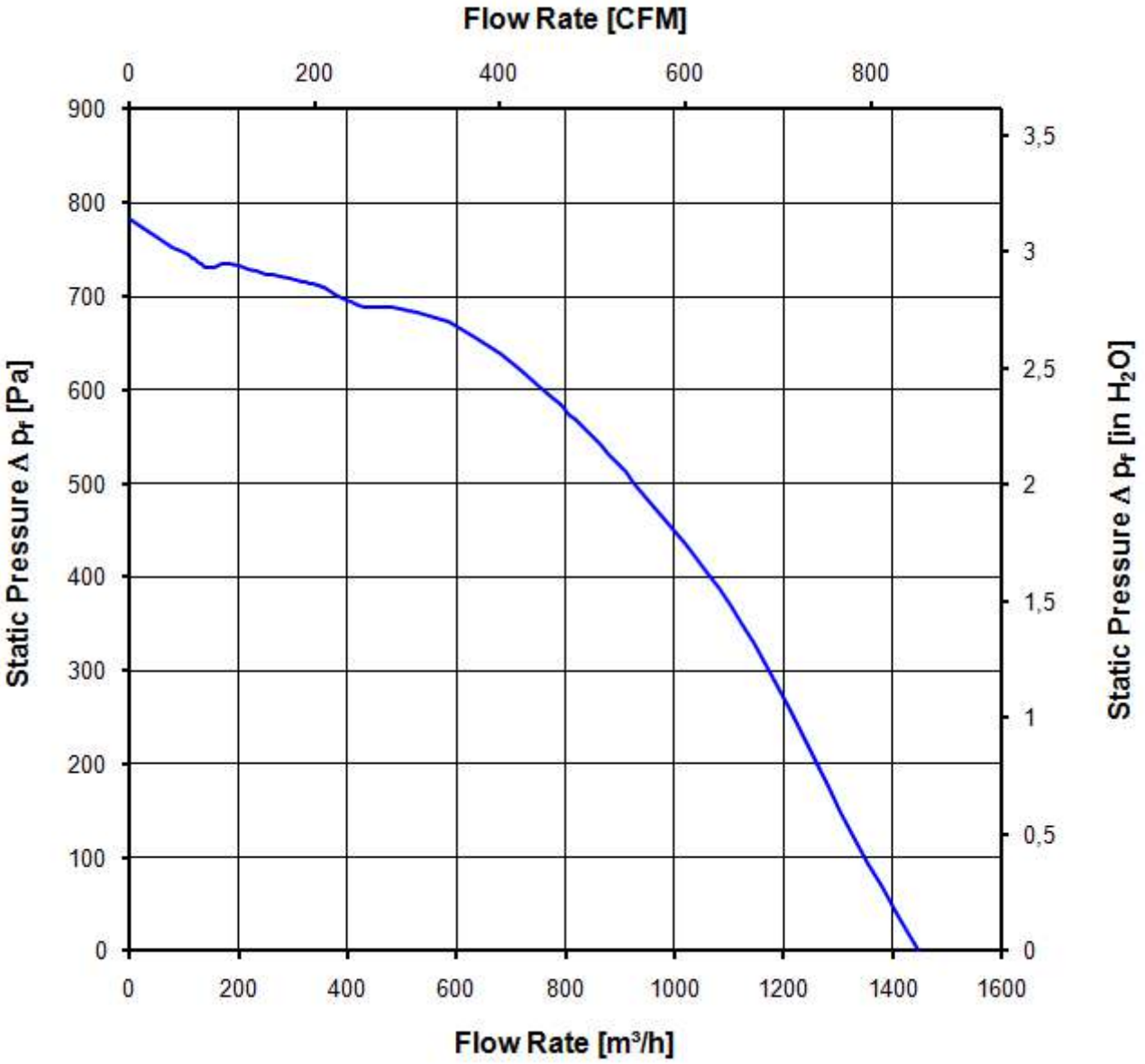
3.6 Aerodynamics

Measurement conditions:	Measured with a double chamber intake rig acc. to DIN EN ISO 5801. Normal air density = 1,2 kg/m3; Temperature 23°C +/- 3°C; In the intake and outlet area should not be any solid obstruction within 0,5 m. The information is only valid under the specified test conditions and may be changed by the installation conditions. If there are deviations from the standard test conditions, the characteristic values must be checked under the installed conditions.

a.) Operation condition:

3.300 1/min at free air flow	U Contr. 10 V		

Max. free-air flow (Δp = 0 / V̇ = max.)	1.447,0 m3/h	
Max. static pressure (Δp = max. / V̇ =0)	780 Pa	



3.7 Sound Data

Measurement conditions:	Sound pressure level: 1 meter distance between microphone and the air intake. Sound power level: Acc. to DIN 45635 part 38 (ISO 10302) Measured in a semianchoic chamber with a background noise level of Lp(A) < 5 dB(A) For further measurement conditions see section 3.5

a.) Operation condition:

3.300 1/min at free air flow	U Contr. 10 V		

Optimal operating point	775,0 m3/h @ 526 Pa	
Sound power level at the optimal operating point	8,1 bel(A)	
Sound pressure level at free air flow, measured in rubber bands		

4 Environment

4.1 General

Min. permitted ambient temperature TU min.	-20 °C	
Max. permitted ambient temperature TU max.	40 °C	
Min. permitted storage temperature TL min.	-40 °C	
Max. permitted storage temperature TL max.	80 °C	

4.2 Climatic Requirements

Humidity requirements	humid heat, constant; according to DIN EN 60068-2-78, 14 days	
Water exposure	None	
Dust requirements	None	
Salt fog requirements	None	

Permitted application area:
The product is intended for use in sheltered rooms with controlled temperature and controlled humidity. Directly exposure to water must be avoided.

Pollution degree 1 (according DIN EN 60664-1)
There is either no pollution or it occurs only dry, non-conductive pollution. The pollution has no negative impact.

4.3 Mechanical Requirements

severity level	Vibration (sinusoidal)	
0,5 G	Vibration (sinusoidal) in use IEC 60068-2-6 Displacement / frequency range Acceleration / frequency range Sweep rate Sweep cycles Duration Axes of vibration	 Vibration (sinusoidal) 0,035 mm / 10-60, 60-10 Hz 0,5 G / 60-500-60 Hz 1 Oct./min 10 2 hrs. 3

severity level	stationary use		
1	storage / transportation	Random vibration not in use IEC 60068-2-64 Frequency range / ASD G_{RMS} Axes of vibration Test duration	 Random vibration 5 - 20 Hz : 1,0 m² / s³ 20 - 500 Hz : - 3 dB / Oct 0,91 G 3 3 x 30 min
	storage / transportation	Bump not in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	 Bump half sine 18 G 6 ms 100 in each direction 600
	stationary use	Random vibration in use IEC 60068-2-64 Frequency range / ASD G_{RMS} Axes of vibration Test duration	 Random vibration 5 - 10 Hz : +6 dB / Oct 10 - 50 Hz : 1,0 m^2 / s^3 50 - 200 Hz : - 6 dB / Oct 0,65 G 3 3 x 30 min
	stationary use	Bump in use IEC 60068-2-29 Shock spectrum Acceleration Duration Number of bumps (+X, -X, -Y, +Y, -Z, +Z) Total bumps	 Bump half sine 5 G 11 ms 100 in each direction 600

Note:
Mounting the fan on upper housing part might cause an increase in noise due to resonances if external excitation above 45 Hz is present.

4.4 EMC

Kind	Electrostatic Discharge Immunity Test
According	DIN EN 61000-4-2:2001-12
Ceck accuracy / Limit	Contact Discharge +/- 4 kV; Air Discharge +/- 8 kV
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	Electromagnetic Field Immunity Test
According	DIN EN 61000-4-3:2006-12
Ceck accuracy / Limit	10 V/m; 80 - 1000 MHz; m = 0,8; f = 1 kHz; 1%; t = 3 s
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	Electrical Fast Transient / Burst Immunity Test
According	DIN EN 61000-4-4:2005-07
Ceck accuracy / Limit	+/- 2 kV on Power Lines; Coupling: POS, NEG, {PE}, ALL, 5 kHz and 100 kHz; 1 min
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

Kind	Immunity to Conducted Disturbances, Induced by RF-Fields
According	DIN EN 61000-4-6:2001-12
Ceck accuracy / Limit	10 Vrms; 150 kHz - 80 MHz; m = 0,8; f = 1 kHz; 1%; t = 3 s
Result	A: The monitored function operates as designed during and after exposure to a disturbance.

5 Safety

5.1 Electrical Safety

Dielectric strength DIN EN 60950 (VDE 0805) and DIN EN 60335 (VDE 0700) A.) Type test Measuring conditions: After 48h of storage at 95% R.H. and 25°C. No arcing or breakdown is allowed! All connections together to ground. B.) Routine test Measuring conditions: At indoor climate. No arcing or breakdown is allowed! All connections together to ground.	500 VAC / 1 Min. 500 VAC / 1 Sec.	
Isolation resistance Measuring conditions: After 48h of storage at 95% R.H. and 25°C measured with U=500 VDC for 1 min.	RI > 10 MOhm	
Clearance / creepage distance	1,0 mm / 1,5 mm	
Protection class	III	

5.2 Approval Tests

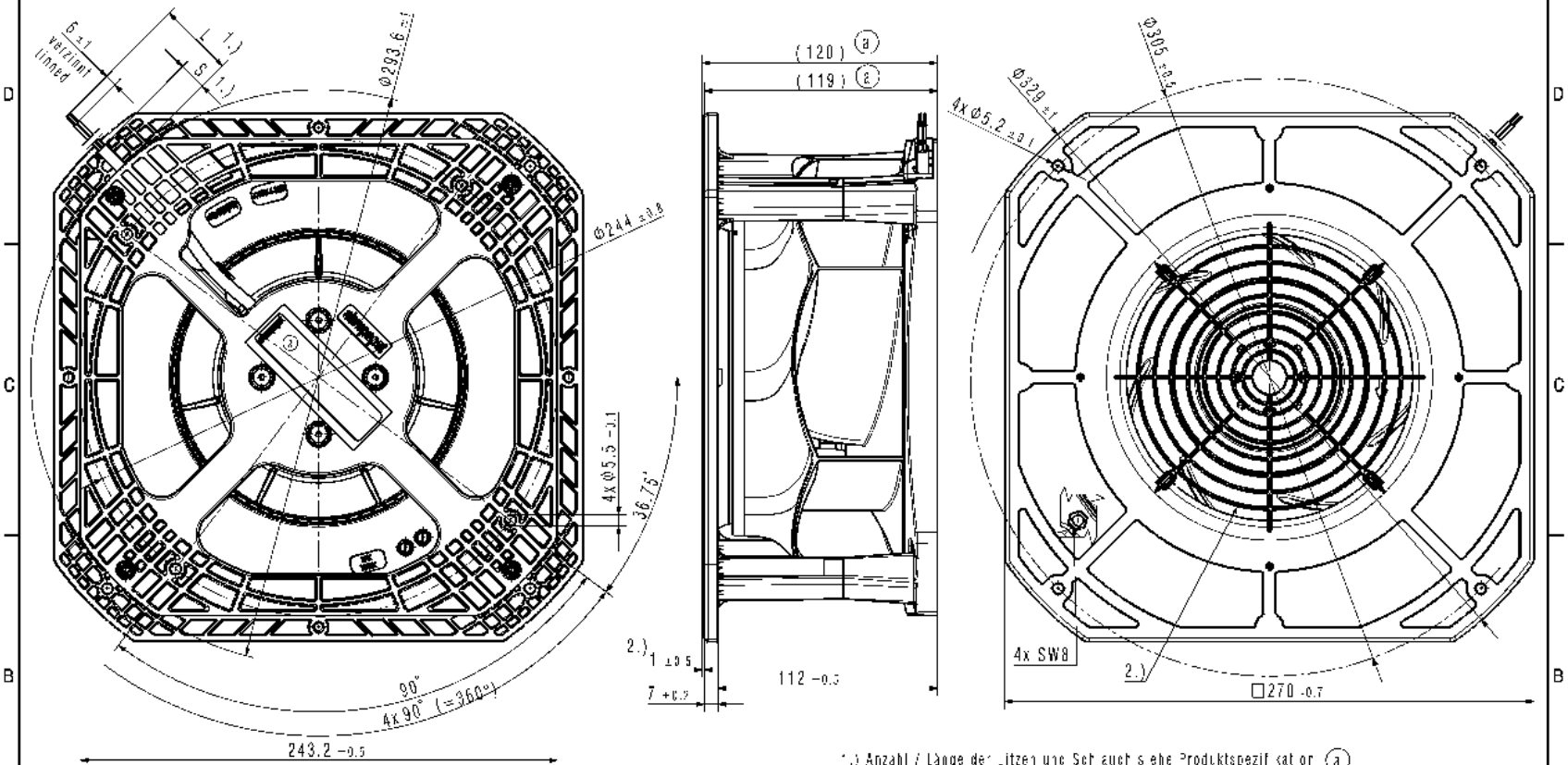
CE	EC Declaration of Conformity	No
EAC	Eurasian Conformity	Yes
UL	Underwriters Laboratories	Yes / UL507, Electric Fans
VDE	Association for Electrical, Electronic and Information Technologies	Yes / Approval acc. to EN 60950 (VDE 0805) - Information technology equipment
CSA	Canadian Standards Association	Yes / CSA audited by UL according to C22.2 No. 113 Fans and Ventilators
CCC	China Compulsory Certification	Yes / GB 12350 Safety Requirements for small Power Motors

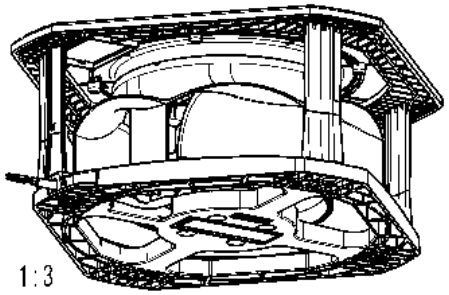
The approval tests are observed to:
U approval max.:60 V @ TU approval max.: 40 °C

6 Reliability

6.1 General

Life expectancy L10 at TU = 40 °C	30.000 h	
Life expectancy L10 at TU max.	30.000 h	
Life expectancy L10 acc. to IPC 9591 at TU = 40 °C	50.000 h	





1.) Anzahl / Länge der Litzen und Schlauch siehe Produktspezifikation (a)
2.) Schutzgitter nur, wenn im Lieferumpfang enthalten

1.) length / number of wires and tube see product specification (a)
2.) Finger guard if included in delivery

SAP Status/Stand	Änd.-Nr. / Änderungsbez.	Datum / Name (Ersteller)	Datum / Name (Freigabe)	Werkstoff / Material:	Maßstab / Scale: 1:1
					Gewicht / Mass: [ ]
				Artikel / Title:	
Toleranzen / Tolerances:		Datum	Name		
Allgemeintoleranzen / Gen. Tolerances:				Projektion / Projection:	Urs. Ersatz / Repl. for:
				ebmpapst	Letzter Tag / Year of Issue: [ ] / Blatt / Page: [ ] / Format: A3